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ABSTRACT

A study was conducted to analyze current job announcements in the field of instructional design and technology and to produce descriptive information that portrays the required skills and areas of knowledge for instructional technology graduates. Content analysis, in its general terms, was used as the research method for this study. One hundred fifty job announcements collected within a 3-year time period were reviewed and categorized into one of the three types of organizations of institutions that announced the position: (1) business and industry; (2) government and military; and (3) university/college/school district. Results are summarized in frequency tables that list competencies for different types of organizations and different types of degrees. Results indicate that job requirements for masters' graduates are different from those for doctoral graduates. They further suggest that, although core courses in instructional design and development appear to be the foci of instructional technology programs, different electives and internship courses may be needed for students who have different career goals. With increasing numbers of job opportunities for instructional designers in higher education and in business and industry, the importance of emphasis on the knowledge and application of computers becomes more critical, and indeed is increasing over time. (Contains 12 tables and 8 references.) (SLD)

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Analysis of Job Announcements and the Required Competencies for Instructional Technology Professionals

ED 405 355

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ABSTRACT

The purpose of this study was to analyze current job announcements in the field of instructional design and technology and to produce descriptive information that portrays the required skills and areas of knowledge for instructional technology graduates. Content analysis, in its general terms, was used as the research method for this study. One hundred fifty job announcements were collected within a three year time period and were reviewed and categorized into one of the three types of organizations or institutions that announced the position: (1)business and industry, (2) government and military and (3) university/college/school district. The results of the study are summarized in frequency tables which list competencies for different types of organizations and different types of degrees. The major findings of the study are also discussed along with recommendations for instructional technology programs.

INTRODUCTION

The demand for top quality instructional technologists with a broad range of skills and knowledge has continued to increase during the past decade. The number of masters' programs administered by Departments of Educational Technology has doubled since 1989 (Johnson, 1992). The growing concern in business, industry, government, military, health, and educational organizations to provide effective training programs to improve the quality of their product requires instructional technologists who are able to perform or function effectively in different settings. This, combined with advances in learning theories, new technologies and communication tools that expand the number of delivery systems, calls for new skills and competencies by instructional technologists. The need for redefining the knowledge base of the field and its ever changing features has also been recognized by the Association for Educational Communications and Technology's Curriculum Committee (1992). The new definition of the field and its domains make the need for the development of a new list of competencies and skills for instructional technologists clear and urgent. Competency studies are needed to provide the conceptual framework for program development. The advances in the field require instructional technology programs to upgrade their curriculum if they want to maintain excellence. However, although leaders of the field have begun to define conceptual frameworks (Richy, 1995) and to identify different domains in the field of instructional technology (Seels, 1995), no study has been reported that indicates the job responsibilities required of instructional technologists given the new advances in technology and communication tools. The existing literature related to the future of the educational technology field also does not provide specifics about the competencies required of the instructional technologists.

The purpose of this study was to analyze current job announcements in the field of instructional design and technology and to produce descriptive information that portrays the required skills and area of knowledge for instructional technology graduates. The intent of the study, therefore, was to develop a list of competencies for instructional technologists that presented the employer's perspective in terms of the job responsibilities that instructional technologists are

expected to undertake. For the purpose of the study the *employer* was defined as an organization or agency that announced a position to hire an individual with instructional technology expertise. *Competency* was defined as an area of knowledge or skill which is critical in performing in specific field or profession.

METHODOLOGY

A combination of quantitative and qualitative content analysis was used to analyze, categorize, and interpret the content of the job announcements. This approach allowed the investigator to formulate a set of categories that emerged from the data (what is said) instead of imposing pre-specified codes to the data and counting how many times each was said.

Ten different sources (Educational Technology Program, Chronicle of Higher Education, electronic mail, local news paper, Washington Post, Tech Trend, individual files, AECT job announcement, Government Job announcement, University job placement) that usually publish or announce job openings were targeted as the main sources in the investigation. Although these sources are not the only ones that publish or announce job openings, they are among some of the popular sources of data for those seeking employment in ISD and were accessible to the investigator. In order to identify the relevant job announcement in the field of instructional design and technology from the sources just listed, the following criteria were used:

1. The title of the job contained words or phrases which are frequently used to define or recognize the field of instructional systems design (ISD) (e.g., instructional designer, educational technologist, instructional technologist, media/multimedia specialist, systems designer, training specialist, performance analyst, etc.).
2. The job requirements matched the current skills and area of knowledge that are emphasized in different programs in the field of instructional design and technology (e.g., knowledge/skills in training, technology, design, development, evaluation, analysis, media/multimedia production, learning theories).
3. The job announcement was sent to university instructional design and technology departments and was posted on the bulletin board or classified by the publisher as

instructional technology, instructional media, instructional computing, training specialist, or instructional design positions.

Job announcements were then searched using the above criteria. If a job opening met at least two of the above criteria, it was selected as a proper content for further analysis. All job openings published or announced in different sources were reviewed, and then a sample of positions within the documents that fit the specified criteria was selected. Next, the selected sample was reviewed again and classified based on the type of the company or institution that announced the position. A total of 150 job openings (57 business and industry, 54 university/school district, and 39 for government and military positions) were identified within a three year time period (see Table 1).

DATA ANALYSIS

File Maker, a database Macintosh program was used to facilitate the data analysis procedure. Each job announcement was examined, and any unit of information related to a required skill or area of knowledge for the job was identified and recorded on a data card. The unit of analysis varied from a key word to a phrase, a sentence, or a short paragraph, based on where the job announcement was published. Categorizing was done using three indicators: (1) the category referred directly or indirectly to a particular skill, knowledge, or experience; (2) the category referred to a skill, knowledge, or experience that could be demonstrated, reported, or explained by the job applicant; and (3) the category was defined by a sentence, a phrase, or a term that was known to the professionals in the field (e.g., media production, design instructional material).

Upon coding or categorizing each unit of information, the data cards that shared the same themes/codes were assigned a core category and a numerical code. Data manipulation was accomplished using the layout tools and mathematical functions of the *File Maker*, program.

RESULTS

The results of the analysis are presented using two statistics. Frequency tables listed the skills and areas of knowledge that emerged from the data and the number of occurrences of each skill and area of knowledge within each separate category. Cross- tabulations compared the occurrence of skills and areas of knowledge within one category to the occurrence of skills and

areas of knowledge within the other categories. The most frequently required skills and areas of knowledge and the least frequently required skills and areas of knowledge were also identified.

Analysis of Job Openings for University or College Positions

The results of analysis for 54 job announcements for university or college positions at both master's and doctoral levels pointed to at least 20 different skills or areas of knowledge in this job category. Table 2 shows these qualifications and their frequency of occurrence.

As Table 2 shows, teaching experience was the most frequent requirement for the university/schools positions. More than 50% of job announcements required the applicant to have experience either at the elementary or secondary school level or at the college or university level. However, when separating the universities and schools positions into two smaller units representing master's and Ph.D. positions (see Tables 2-1 and 2-2), the frequency of teaching experience for positions at the master's level decreased from 50% to 33% ,while it increased from 50% to 61% for the positions at the doctoral level. This difference can be explained by the title of the positions at two levels (Ph.D. & master's). The job openings that required a Ph.D. degree were usually for assistant professors or teaching positions. Job openings that asked for a master's degree ranged from administrative positions in the field of instructional design and technology to research assistant, instructional designer, or media specialist. The job title, therefore, identifies the importance of teaching experience for a "faculty position" in the field, however, it is not a crucial requirement for a "media specialist" or "instructional designer."

The next two most frequent qualifications for university/school positions (see Table 2) were related to knowledge or ability to teach courses in multimedia or advanced technology and knowledge and experience in computer-based instruction and product development. As Table 2 shows, around 39% of the job announcements asked for either knowledge or experience in multimedia or advanced technology and the ability to teach courses or to develop instructional products in these areas (see table 2). This percentage increased to 50% for the jobs at the master's level and remained almost the same for the Ph.D. positions (see Tables 2-1 and 2-2). The same result was found in a study conducted by Dempsey and Rasmussen (1993) to identify the

instructional design and development competencies in a new academic program. In this study the graduate students, who were surveyed, indicated the need for competencies in multimedia and computer-based instruction in their program.

The knowledge of design, development and implementation, maintain record of research, knowledge and/or experience in telecommunication or distance education, the ability to teach courses in instructional design theories and application of instructional technology were at the fourth, fifth, sixth and seventh levels of importance for this category of positions. Further analysis showed that knowledge and skills of design development and implementation was presented into three different categories of job requirements (knowledge of instructional design, development and implementation, ability to teach courses in instructional technology, ability to teach instructional computing) for faculty positions, while they were reported as one skill (knowledge and experience in design, development and implementation) for master's-level jobs (see Tables 2-1 and 2-2).

Cross-comparison analysis was conducted to further determine the differences between skills and areas of knowledge required for positions at the doctoral level and positions at the master's level. In spite of the overall similarities across the two groups, there were some skills that appeared on job announcements for master's level positions (e.g., experience in project management and knowledge of test construction), but did not appear on job announcement for doctoral- level positions; the reverse was also true. While production of grant proposals and the ability to teach instructional theories and computing were among the skills that were required for positions at the Ph.D. level, there were no indications of such skills for master's-level jobs.

Analysis of Job Openings for Business and Industry Positions

As presented in Table 3, 19 skills and areas of knowledge were found in the content of job announcements for positions in business and industry. The most frequent skill or area of knowledge required for jobs in this category was knowledge and experience in design, development, and implementation of training programs (47%). The second and the third requirements were knowledge or experience in training and conducting workshops (approximately 35%) and experience or skills in project management and consulting (30%), respectively.

Curriculum, material development and a working knowledge of computers were skills and areas of knowledge that appeared in more than 30% of the job announcements.

A closer look at the units of analysis and their changes over time showed that the emphasis on the knowledge and skills in instructional design and development decreased over time, whereas knowledge and experience in computers (software and hardware) increased. As Table 3-1 shows, between 1990 and 1991, 12 out of the 17 job announcements that were reviewed required knowledge or experience in instructional design and development. This number changed from 1992 to 1993, as only 15 out of 38 job openings directly asked for experience and knowledge in instructional design and development. The opposite trend was noted regarding the requirement of knowledge or experience in computers (software and hardware). Out of 38 job announcements in the year 1992 to 1993, 12 required some computer experience, whereas only 4 job announcements between 1990 and 1991 required these skills and area of knowledge for the announced positions. The frequency of knowledge and experience in multimedia and advanced technology, on the other hand, showed the opposite pattern of changes (declined from 35% to 18%).

The degree requirement for the jobs in this category was a master's degree, with a few cases in which the doctorate was preferred. The titles of the positions, however, varied based on the company and the nature of the job. Table 3-2 reports the most frequent titles for this category of positions.

Analysis of Job Openings in Government and Military Positions

From 39 job announcements reviewed for the positions in government and military, 20 skills and areas of knowledge were identified. Table 4 shows the list of these qualifications and also the frequencies of their occurrence. The most frequent requirement (33%) for this category of jobs was experience either in teaching or training. When separating the jobs into two smaller units, government and military, the same result was found (see tables 4-1 and 4-2). The next two most frequent skills and areas of knowledge were knowledge or experience in program evaluation and /or needs assessment (23%) and knowledge and experience in planning and implementing educational programs or training (20%). Knowledge and experience in instructional design and

development and curriculum and material development were the next most frequent requirements for jobs in this category. The degree requirement for most of the job openings was a master's degree. The title of positions varied, but the most frequent titles for this category of jobs were program specialist and training or staff development specialist.

Analysis of Skills and Knowledge across Different Categories of Jobs

Comparison of the content of the skills and knowledge found in different categories of positions showed that 14 qualifications were similar across different categories of jobs (see Table 5). As Table 5-1 shows, there were two qualifications that appeared only in university jobs (grant proposal writing and ability to teach instructional computing); three qualifications that appeared in both university and business and industry jobs but were not mentioned in the government and military positions (knowledge and/or experience in telecommunications and distance learning, presentation skills, and leadership or teamwork skills); and one qualification that appeared in business and industry and government jobs but did not appear in university positions (knowledge of adult learning).

The second cross-tabulation (see Table 5) compared each skill or area of knowledge and its frequency by different job categories. Since the sample size for different job categories was not equal, it is difficult to compare the frequency of skills and areas of knowledge across each category numerically. However, there are some skills and areas of knowledge across three categories of jobs that show considerable differences or similarities. For example, as Table 5-2 shows, teaching or training experience is the most frequent requirement for both university and government jobs and the second most frequent requirement for business and industry positions. Experience or knowledge in instructional design and development was the number one requirement for business and industry jobs, second for government and military, and fourth for the university positions. This indicates that knowledge and experience in instructional design and development is still one of the most important requirements for business and industry jobs and an important skill in the other two categories of jobs. This result is in agreement with the result of a study conducted by Sullivan, et. al (1993). In this study four different groups of respondents (graduate students, trainer and

faculty) to a survey were in agreement that instructional technology graduates should be more skilled in instructional design and development than in computers.

The cross-tabulation table also indicated the following differences across three categories of jobs. Knowledge or experience in curriculum and materials development was the fourth most frequent skill and area of knowledge for business and industry, and the fifth most frequent skill and area of knowledge for government and military positions, but such was not among the important requirements for university jobs. In each category of jobs, among the first five important requirements, there was one item that was not common in all three. This item was knowledge and experience in advanced media and technology in university settings, project management in business and industry settings, and experience in program evaluation in government and the military category.

DISCUSSION AND RECOMMENDATIONS

The results of the study indicated that, generally, job requirements for masters' graduates are different from job requirements for doctoral graduates. For example, while graduates from the master's program are expected to be competent in project management and instructional design and development, doctoral graduates are required to have experience in teaching, conducting research and writing grant proposals. However, both groups are expected to have experience and knowledge in computer technology and multimedia production. The findings also show that somewhat different skills and areas of knowledge are required of instructional technologists in different institutions (university and/or school, government, business and industry, military). It seems that the nature of the jobs in different institutions and their needs with respect to instructional design activities will always require different sets of skills and areas of knowledge as well as substantial areas of overlap.

These results suggest that although core courses in instructional design and development (design, development/production, evaluation), multimedia production and knowledge in computers appear to be the foci of instructional technology programs, different electives and internship courses may need to be offered for students who have different career goals. This could require

instructional technology programs to work with other disciplines such as business and marketing, communication, computer technology, evaluation and measurement, and research and statistics to provide a broad spectrum of knowledge and skills required in different jobs for their applicants. Hence, instructional technology programs should consider offering a broad spectrum of courses as well as a group of faculty with diverse specialty areas. These findings also suggest consideration of early guidance and advising for both master's and doctoral students.

The results of the study also indicate that with increasing numbers of job opportunities for instructional designers in higher education and continuing demands for designers in business and industry, the importance of emphasis on the knowledge and application of computers and advanced technology becomes even more critical. Whether or not instructional technology programs can keep up with the advances in new technologies to provide the proper training environment for their students cannot be predicted. However, it seems that with respect to advances in technology much of what is considered as basic knowledge and skills for graduates of instructional technology programs today may become trivial within next few years. Hence continuous examination of current as well as the up-and-coming relevant technologies in the field should be considered by instructional technology (IT) programs. Furthermore, since job descriptions are not specific with regard to basic knowledge and skills in computer and advanced technology required of graduates, the IT programs may also need to conduct a careful analysis of basic knowledge and skills for operating and using new technology periodically to identify areas of changes for revision of the basic skills.

The study also showed that the emphasis on the knowledge and skills in instructional design and development in job announcement decreased over time, whereas knowledge and experience in computers (software and hardware) increased. This result may reflect the employers' concerns about applicants' knowledge and skill in computers while assuming that the mastery of instructional design and development have already been emphasized enough in IT programs. This finding again suggests that since the costs of micro-computers are decreasing and their availability is increasing, the demand for instructional technologists who are able to design and develop

complex CAI and CBI programs will increase even more in the future. Thus IT programs should consider providing not only authoring courses but also course in advanced theories and research in computer based instruction.

The findings of this study further suggest that while the ability to utilize the emerging technology will be important for instructional technologists who seek jobs in higher education and business and industry, the fundamental skills of analysis, design, development, implementation and evaluation are still the major job requirements for instructional designers. This result indicates the importance of design principles and models as the theoretical foundations of the field. However, instructional technology programs need to provide more complex learning environments and delivery systems for their students in order to enable them to acquire the fundamental design skills.

Finally, the results of the study indicated the importance of the communication (oral and written) and leadership and management skills for most of the positions in the field. A few studies being conducted to identify the areas of program change also indicated the importance of interpersonal communication, team work and management skills for instructional technologists (e.g., Gustafson et. al. 1993; Morlan & Lu-Mei-Jan, 1993). It seems that instructional technology programs must emphasize more specifically on these skills if they want to best prepare their graduates for their future job responsibilities.

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TABLE 1
Sample Size and Time Period in each Category

Category	Sample Size	Time Period
• Business and Industry	57	Feb. 1990- May 1993
• University/School District	54	Feb. 1992- May 1993
• Government/Military	39	Feb. 1990- May 1993

TABLE 2

Required Skills and Knowledge for University/College/ School District (Ph.D. and Master's Degree) Positions

Rank	Skills/Knowledge	Percent
1	Teaching Experience	51.9
2	Knowledge/Ability to Teach Advanced Media/Technology	38.9
3	Knowledge/Experience in Computer-Based Instruction/Computer-Based Product Development	27.8
4	Knowledge/Experience in Design, Development, Implementation	22.2
5	Record of Research	20.4
6	Knowledge/Experience in Telecommunication/Distance learning	18.5
7	Ability to Teach Courses in Instructional Theories and Application of Instructional Technology	16.7
8	Knowledge/Experience in Computers Softwares (e.g., Word Processing, Database, Spreadsheets)	16.7
9	Publication/Demonstration of Writing Ability	14.8
10	Ability to Teach Instructional Computing (Application of Computers)	11.1
11	Knowledge/Experience in Evaluation	9.3
12	Experience in Project Management	7.4
13	Knowledge of Test Construction	7.4
14	Knowledge of Learning Theories/Cognitive Theories	7.4
15	Experience in Curriculum/Material Development	5.6
16	Production of Grant Proposals	5.6
17	Knowledge of Statistics	5.6
18	Paper Presentation	3.7
19	Needs Assessment/Needs Analysis/Task Analaysis	1.9
20	Leadership Skills	2.8

Total number of jobs reviewed was 54

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TABLE 2-1

Required Skills and Knowledge for University (Ph.D. Degree) Positions

Rank	Skills/Knowledge	Percent
1	Teaching Experience	61.1
2	Knowledge/Ability to Teach Advanced Media/Technology	30.6
3	Record of Research	27.8
4	Ability to Teach Courses in Instructional Theories and Application of Instructional Technology	25.0
5	Knowledge/Experience in Computer-Based Instruction/Computer-Based Product Development	22.2
6	Knowledge/Experience in Computers Softwares (e.g., Word Processing, Database, Spreadsheets)	19.4
7	Ability to Teach Instructional Computing (Application of Computers)	16.7
8	Publication/Demonstration of Writing Ability	16.7
9	Knowledge/Experience in Design, Development, Implementation	16.7
10	Knowledge/Experience in Telecommunication/Distance Learning	13.9
11	Knowledge of Learning Theories/Cognitive Theories	8.3
12	Production of Grant Proposals	8.3
13	Paper Presentation	5.6
14	Experience in Curriculum/Material Development	5.6
15	Knowledge/Experience in Evaluation	2.8
16	Needs Assessment/Needs Analysis/Task Analaysis	2.8
17	Knowledge of Statistics	2.8
18	Leadership Skills	2.8

Total number of jobs reviewed was 36

TABLE 2-2

Required Skills and Knowledge for University/College/School District (Master's Degree) Positions

Rank	Skills/Knowledge	Percent
1	Knowledge/Experience in Broad Range of Advanced Media/Technology (Multimedia, Interactive Video,Video	50.0
2	Knowledge/Experience in Computer-Based Instruction	38.9
3	Knowledge/Experience in Design, Development, and Implementation of Educational Programs	33.3
4	Experience in Teaching/Training	33.3
5	Knowledge of Curriculum Design and Material Development	33.3
6	Knowledge/Experience in Telecommunications/ Distance Learning	27.8
7	Experience in Project Management	22.2
8	Knowledge of Evaluation (Formative and Summative)	22.2
9	Knowledge of Test Construction	22.2
10	Experience in Data Analysis Procedures/Research skills	16.7
11	Knowledge/Experience in Computers (Softwares)	11.1
12	Record of Publication	11.1
13	Knowledge of Theories and Instruction	5.6

Total number of jobs reviewed was 18

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TABLE 3

Required Skills and Knowledge For Business and Industry Positions

Rank	Skills/Knowledge	Percent
1	Knowledge/Experience in Design, Development, and Implementation of Training Programs	47.4
2	Knowledge/Experience in Training/Conducting Workshops	35.1
3	Experience/Skills in Project Management/Consulting/Organizational Management	30.0
4	Knowledge/Experience in Curriculum and Material Development	30.0
5	Working Knowledge of Computers (Hardware, Software, Authoring System)	28.1
6	Knowledge/Skills in Needs Assessment/Performance Analysis	28.1
7	Knowledge/Experience in Media Development (Including Advanced Media)/ Familiarity with Advanced Technology Tools	24.6
8	Knowledge/Skills in Evaluation (Formative and Summative)	19.3
9	Knowledge/Experience in Computer-Based Instruction/Training	19.3
10	Knowledge of Adult Learning	14.0
11	Writing and Interpersonal Skills	14.0
12	Knowledge of Assessment Tools	10.5
13	Teaching Experience in K-12	8.8
14	Skills in Leadership and Teamworking	8.8
15	Knowledge of Data Gathering, Data Anlysis, Content Analysis/Research Skills	7.0
16	Knowledge/Experience in Telecommunications/ Distance Learning Program	5.3
17	Experience in Marketing	5.3
18	Knowledge of Learning Theories	5.3
19	Skills in Platform Presentation	3.5

Total number of jobs reviewed was 57

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TABLE 3-1

Changes in Required Skills/Knowledge for Business and Industry Positions Over Time

Skills/Knowledge	1990-1991			1992-1993		
	# of Jobs Reviewed	F	%	# of Jobs Reviewed	F	%
Knowledge/Experience in Design and Development	17	12	70.5	38	15	39.5
Knowledge/Experience in Computers (Software and Hardware)	17	4	23.5	38	12	31.6
Knowledge/Experience in Advanced Media/Technology	17	6	35.3	38	7	18.4

TABLE 3-2

Frequency of Job Titles in Business and Industry Positions

Job Title	Frequency
Instructional Designer/Instructional Technologist	20
Project Manager for Instructional Design	8
Training Specialist/Coordinator	8

TABLE 4

Required Skills and Knowledge For Government and Military Positions

Rank	Skills/Knowledge	Percent
1	Experience in Teaching/Training	33.3
2	Knowledge/Experience in Program Evaluation/Needs Assessment	23.1
3	Knowledge/Experience in Planning, Implementation of Educational Programs/Training	20.5
4	Knowledge/Experience in Instructional Design and Development	18.0
5	Knowledge/Experience in Curriculum and Material Developemnt	18.0
6	Knowledge/Experience in Computer-Based Instruction/Training	15.4
7	Knowledge of Computers (Hardware, Software)	15.4
8	Writing and Communication Skills	15.4
9	Experience in Program Management	12.9
10	Knowledge of Data Collection and Data Analysis	10.3
11	Knowledge/Experience in Testing and Measurement	10.3
12	Ability to Utilize Computer-Based Network/Develop Courses in Distance Learning	7.7
13	Presentation Skills/Experience in Public Speaking	5.1
14	Knowledge of Adult Learning	2.6
15	Knowledge/Experience in Strategic Planning	2.6
16	Experience in Computer Analysis and Programming	2.6
17	Staff Development	2.6
18	Leadership Skills	2.6

Total number of jobs reviewed was 39

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TABLE 4-1
Required Skills and Knowledge for Government Positions

Rank	Skills/Knowledge	Percent
1	Experience in Teaching/Training	27.3
2	Knowledge/Experience in Planning, Implementation of Educational Programs/Training	24.2
3	Writing and Communication Skills	18.2
4	Knowledge/Experience in Program Evaluation/Needs Assessment	21.2
5	Knowledge of Computers (Hardware, Software)	18.2
6	Knowledge/Experience in Computer-Based Instruction/Training	12.1
7	Knowledge/Experience in Instructional Design and Development	12.1
8	Knowledge/Experience in Curriculm and Material Developemnt	12.1
9	Knowledge of Data Collection and Data Analysis	12.1
10	Experience in Program Management	12.1
11	Ability to Utilize Computer-Based Network/Develop Courses in Distance Learning	6.1
12	Knowledge/Experience in Testing andMeasurement	6.1
13	Presentation Skills/Experience in Public Speaking	6.1
14	Knowledge of Adult Learning	3.0
15	Knowledge/Experience in Strategic Planning	3.0
16	Experience in Computer Analysis and Programming	3.0
17	Staff Development	3.0
18	Leadership Skills	3.0

Total number of jobs reviewed was 33

TABLE 4-2

Required Skills and Knowledge or Military Positions

Rank	Skills/Knowledge	Percent
1	Experience in Simulation and Training	66.7
2	Knowledge of Instructional Design and Development	50.0
3	Knowledge of Curriculum and Material Development	50.0
4	Knowledge/Experience in Developing Instruction Computer Sotware/Program/System	50.0
5	Knowledge of Curriculum Design and Material Development	50.0
6	Knowledge/Skills in Computer-Based Training	33.3
7	Knowledge/Experience in Test Construction	33.3
8	Knowledge of Evaluation	33.3
9	Knowledge of Learning Theories and Psychology	16.7
10	Knowledge of Modern Electronic Technology	16.7
11	Management Skills	16.7

Total number of jobs reviewed was 6

TABLE 5

Required Skills and Knowledge and their Frequencies from Cross-tabulation of Categories

Skills/Knowledge	University/College School District	Business & Industry	Government/ Military
	%	%	%
Teaching/Training Experience	51.9	35.1	33.3
Knowledge/Experience in Advanced Media/Technology	38.9	24.6	2.6
Record of Research	20.4	1.8	10.2
Knowledge/Experience in Instructional Computing (CBI, CAI)	27.8	19.3	15.3
Knowledge/Experience in Instructional Design & Development	22.2	47.4	28.0
Knowledge/Experience in Computers (Software, Hardware, Authoring System)	16.7	28.1	23.1
Publication/Writing	14.8	14.0	15.4
Knowledge/Experience in Telecommunication/DistanceLearning	18.5	5.3	0
Knowledge of Learning Theories/Cognitive Theories	7.4	5.3	2.6
Ability to Teach Instructional Computing	11.1	0	0
Grant Proposal Writing	5.6	0	0
Presentation Skills	3.7	3.5	0
Knowledge/Experience in Evaluation	9.3	19.3	19.4
Curriculum/Material Development	5.6	30.0	18.0
Needs Assessment/Needs Analysis/Task Analaysis	1.9	28.1	5.1
Data Analysis/Statistics	5.6	7.0	10.3
Project Management	7.4	30.0	12.8
Test Construction	7.4	10.5	10.3
Knowledge of Adult Learning	0	14.0	2.6
Leadership/Teamwork Skills	1.9	8.8	0

Total number of job reviewed was 150

TABLE 5-1

Comparison of the Content of the Skills and Knowledge Across Different Job Categories

Skills/Knowledge	University/ College/School	Business & Industry	Government & Military
Grant Proposal Writing & Ability to Teach Instructional Computing	√	--	--
Knowledge/Experience in Telecommunication/Distance Education	√	√	--
Presentation Skills	√	√	--
Leadership/Team Work Skills	√	√	--
Knowledge of Adult Education	--	√	√

TABLE 5-2

Required Skills and Knowledge from Crosstabulation of Categories

University/College School District		Business & Industry		Government/Military	
Skills/Knowledge	%	Skills/Knowledge	%	Skills/Knowledge	%
Teaching/Training Experience	51.9	Knowledge/Experience in Instructional Design & Development	47.4	Teaching/Training Experience	33.3
Knowledge/Experience in Advanced Media/ Technology	38.9	Teaching/Training Experience	35.1	Knowledge/Experience in Instructional Design & Development	28.0
Knowledge/Experience in Instructional Computing (CBI, CAI)	27.8	Knowledge/Experience in Poject Management	30.0	Knowledge/Experience in Computers (Hardware, Software, Authoring System	23.1
Knowledge/Experience in Instructional Design & Development	22.2	Knowledge/Experience in Curriculum and Material Development	28.1	Knowledge/Experience in Evaluation	19.4
Record of Research	20.4	Knowledge/Experience in Computers (Hardware, Software, Authoring System	28.1	Knowledge/Experience in Curriculum and Material Development	18.0

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